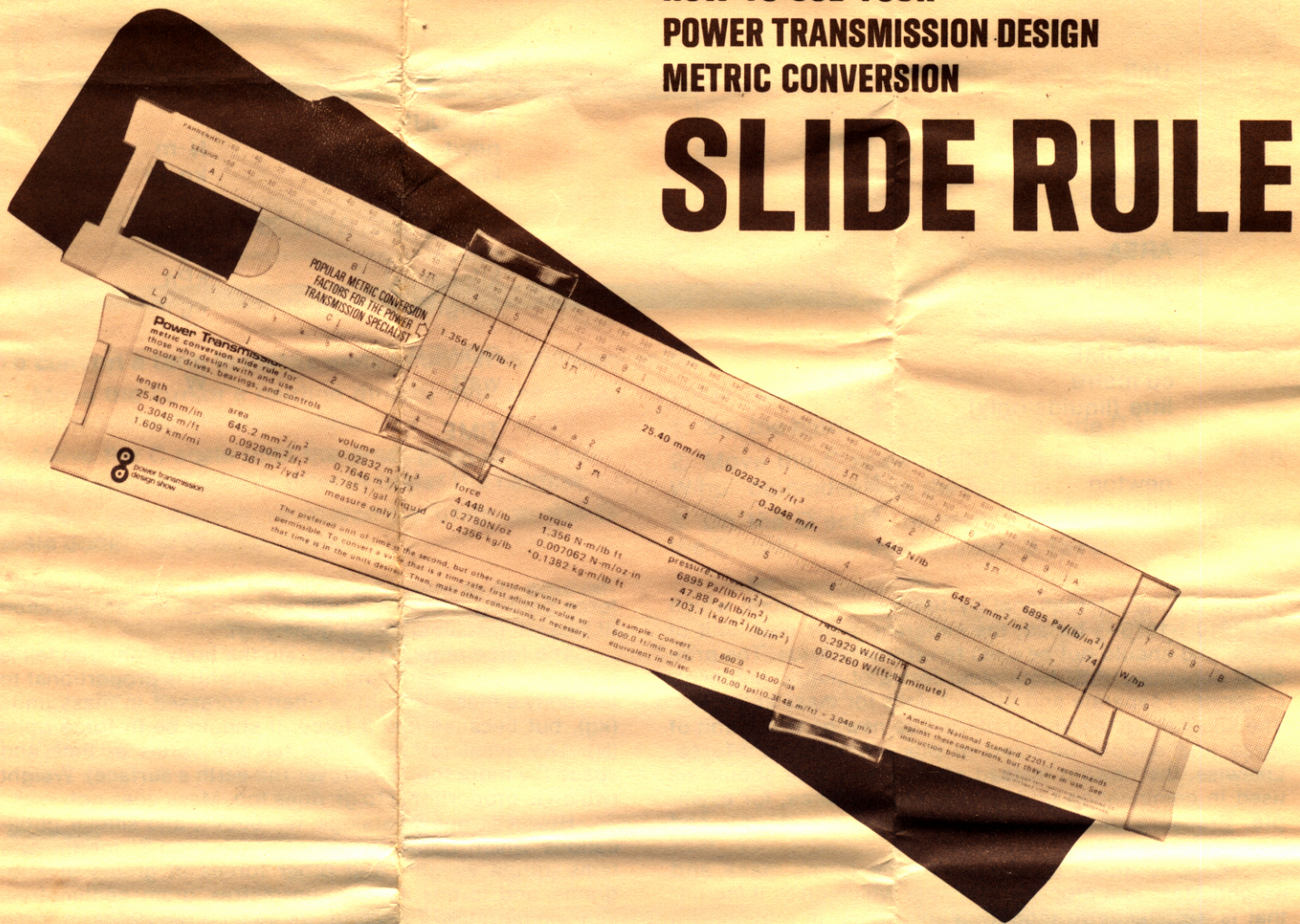


HOW TO USE YOUR
POWER TRANSMISSION DESIGN
METRIC CONVERSION

SLIDE RULE



Your POWER TRANSMISSION DESIGN metric conversion slide rule simplifies conversions that the power-transmission specialist is likely to make in his regular work. It was designed by the editors of POWER TRANSMISSION DESIGN Magazine, reviewed by men in the power-transmission industry, and manufactured by Pickett, Inc., Santa Barbara, Calif.

Conversion constants, spellings, symbols, and notation methods agree with American National Standard Z210.1-1973, *Metric Practice Guide*, except where noted otherwise. Exceptions include conversions which are not recommended in AN Z210.1-1973, but which you are likely to encounter in catalogs, textbooks, and similar materials. They are identified with an asterisk (*) on your slide rule. Another exception: AN Z210.1-1973 recommends spacing digits in groups of three to the right and left of the decimal point. To save space on the rule, all numbers have minimum space between digits.

We encourage you to review AN Z210.1-1973. Order from:

Sales Dept.
American National Standards Institute
1430 Broadway
New York, NY 10018

Single copy price: \$1.50, payable with order.

REGULAR SLIDE-RULE OPERATIONS

Your metric conversion slide rule includes these scales for mathematical operations: C and D, for multiplication and division; A and B, for squares and square roots; L, for logarithms and antilogarithms. Study the parts of the enclosed booklet on the use of your Pickett slide rule that deal with the scales on your rule. Work through the sample problems. Assure yourself that you understand the terms that apply to the slide rule's parts and that you can apply your rule to common problems.

METRIC CONVERSIONS

The C scale of your rule includes graduations for several of the most common conversion factors. The reverse side of the rule lists many others. All conversions between the SI (metric) system and the customary (inch-based, English, or foot-pound-second) system are taken from AN Z210.1-1973 and rounded

at the fifth significant digit. They are accurate to four significant digits as given on the rule. Because your rule is accurate generally to *three* significant digits, your slide rule conversions will be accurate to no more than three significant digits.

The metric units on the rule are:

Unit	Symbol
LENGTH	
millimetre	mm
metre	m
kilometre	km
AREA	
sq millimetre	mm ²
sq. metre	m ²
VOLUME	
cu metre	m ³
litre (liquids only)	l
FORCE	
newton	N
kilogram*	kg

Unit	Symbol
TORQUE	
newton·metre	N·m
kilogram·metre*	kg·m
PRESSURE, STRESS	
pascal	Pa
kilopascal	kPa
kilogram/sq metre*	kg/m ²
POWER	
watt	W
TIME	
second	s

*Under SI (the International System of Units), upon which AN Z210.1-1973 is based, the kilogram is the base unit of *mass*, and should not be used to represent force. The principal departure of SI from older forms of metric engineering units is separate and distinct units for mass and force. The kilogram is the unit of mass. The newton is the unit of force and should be used in place of kilogram-force. Likewise, the newton instead of kilogram-force should be used in combination units which include force, for example: Pressure or stress (N/m²=Pa); torque (N·m); and power (N·m/s=W).

There is much confusion in the terms *mass* and *weight*. Mass is a property of matter which gives it *inertia*; that is, resistance to motion or to change in motion. If a body at rest on the earth's surface is released from the

force holding it at rest, it will experience the acceleration of free fall (acceleration of gravity, g).

The force required to restrain the body from free fall is its *weight*. The restraining force (weight) is proportional to the body's mass. Weight is often expressed in mass units (kg), but because it is a force, it should be in force units (N). The acceleration of free fall (g), varies in time and space (by more than 0.5% over the earth's surface). Weight (which is proportional to g), does too. Mass does not.

However, many catalogs, textbooks, and similar publications which quote *specifications in non-SI metric systems*, quote weights and other forces in grams or kilograms, and torque in kilogram·metres, gram·centimetres, and similar units. Therefore, we include the kilogram-force conversions here with the admonition that it is outside SI.

USING THE C-SCALE CONVERSION GRADUATIONS

To convert a term in customary units to one in metric units:

1. Set the C-scale index over the value to be converted, on the D scale.
2. Move the cursor's hairline over the correct

C-scale graduation.

3. Read your answer in metric units on the D scale.

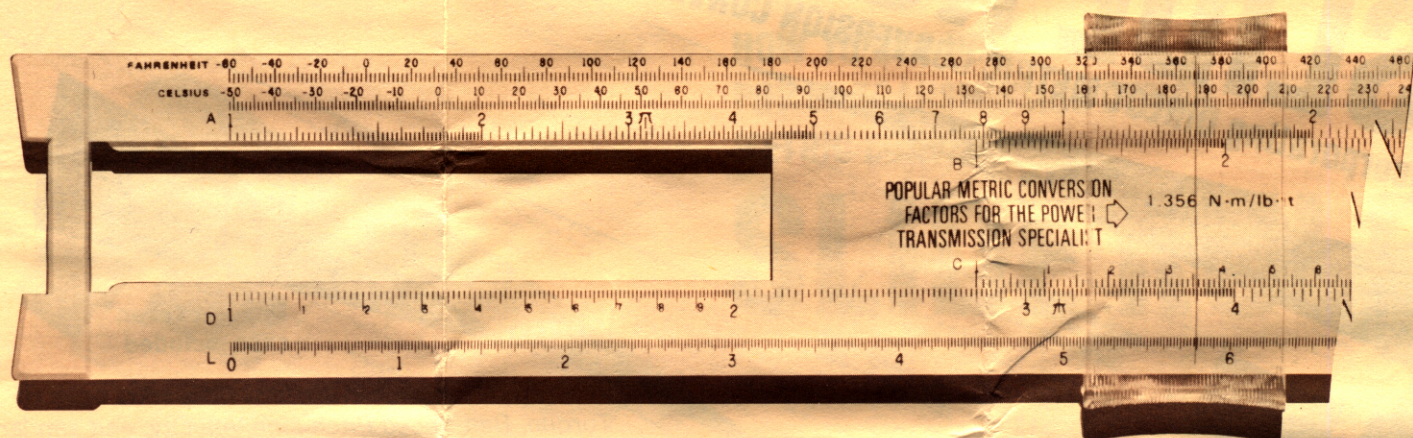
EXAMPLE: Convert 28 lb-ft torque to its equivalent in N·m.

1. Set the left-hand C-scale index over "28" on the D scale.
2. Move the cursor until its hairline coincides with

the graduation for "1.356 N·m/lb·ft."

3. On the D scale, beneath the hairline, read your answer: 3.80 N·m.

(See the enclosed booklet on use of your Pickett slide rule for decimal-point location.)



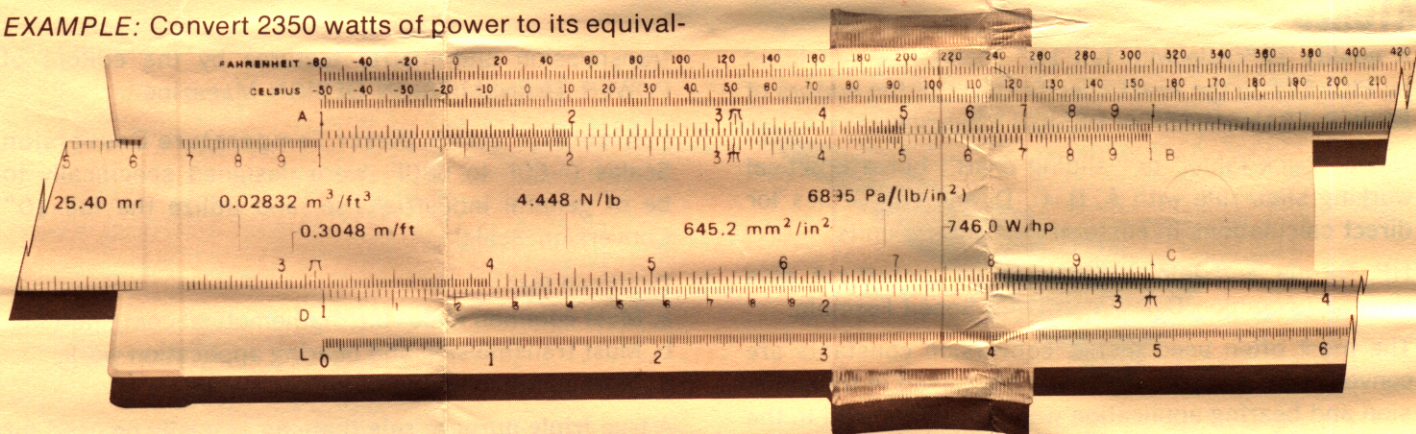
To convert a term in metric units to one in customary units:

1. Move the cursor's hairline directly over the value to be converted, on the D scale.
2. Move the C scale until the graduation for the correct conversion factor is directly under the hairline.
3. Read your answer in customary units on the D scale under the C-scale index.

ent in horsepower.

1. Set the hairline over "2350" on the D scale.
2. Move the C scale until the graduation for "746.0 W/hp" coincides with the hairline.
3. On the D scale, beneath the right-hand index of the C scale, read your answer: 3.15 hp.

EXAMPLE: Convert 2350 watts of power to its equivalent



NOTE THAT, WHETHER YOU CONVERT CUSTOMARY TO METRIC OR METRIC TO CUSTOMARY, YOUR ANSWER IS ON THE D SCALE.

USING THE TEMPERATURE-CONVERSION SCALE

Your rule includes a temperature-conversion scale across the top stator for conversion between Fahrenheit and Celsius (pronounced *sēl'sī-ŭs*) scales from -60 to +680 F. The Celsius scale corresponds to the Centigrade scale commonly used in non-SI metric systems.

To convert between Fahrenheit and Celsius temperatures, set the hairline over the temperature to be converted. Read the answer on the opposite scale.

EXAMPLE NO 1: Convert 200 F to its metric equivalent.

1. Set the hairline over "200" on the Fahrenheit scale.

2. Read your answer beneath the hairline on the Celsius scale: 93.3 C.

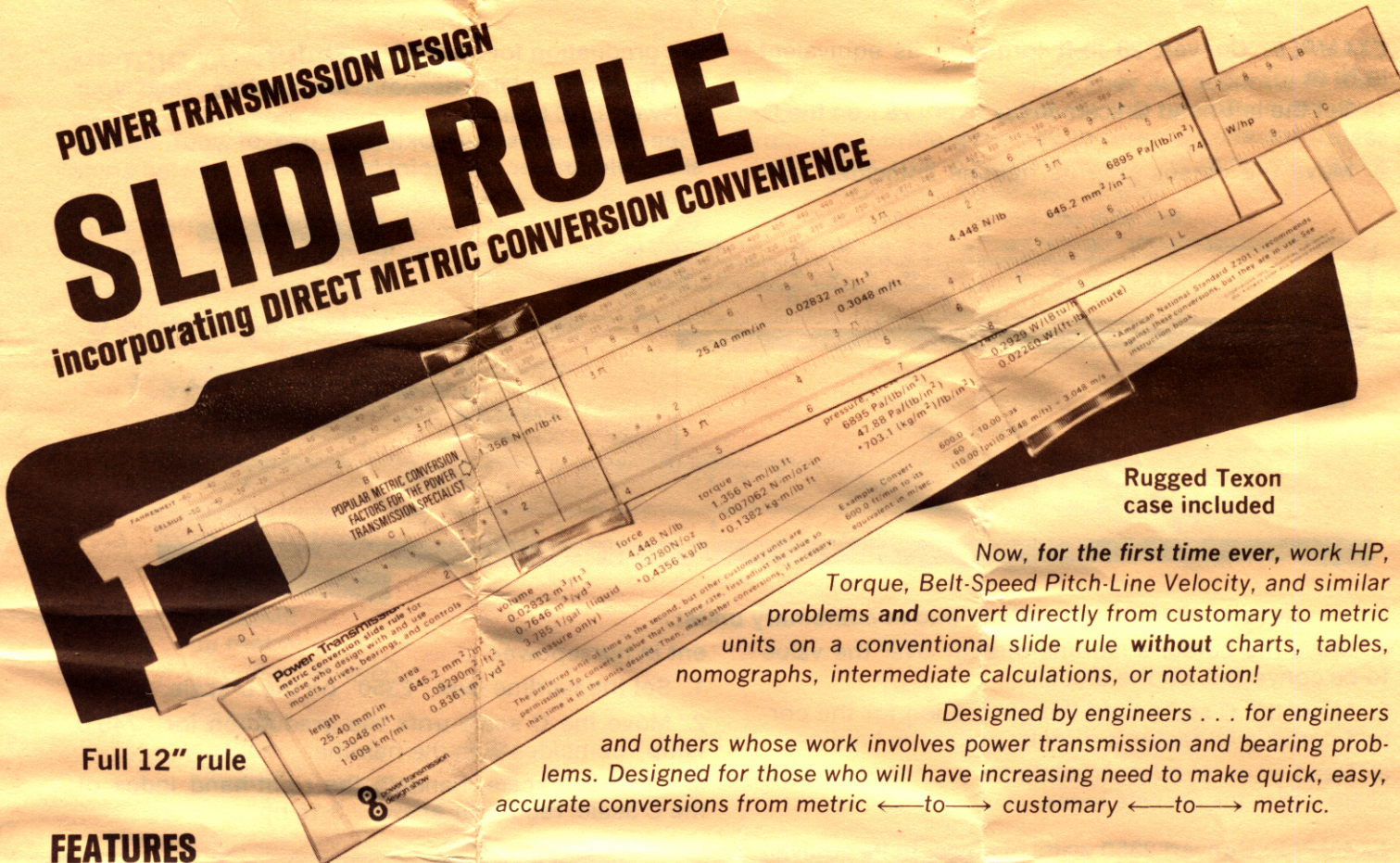
EXAMPLE NO 2: Convert 200 C to its customary equivalent.

1. Set the hairline over "200" on the Celsius scale.
2. Read your answer beneath the hairline on the Fahrenheit scale: 392 F.

POWER TRANSMISSION DESIGN

SLIDE RULE

incorporating DIRECT METRIC CONVERSION CONVENIENCE



Rugged Texon
case included

Now, for the first time ever, work HP, Torque, Belt-Speed Pitch-Line Velocity, and similar problems and convert directly from customary to metric units on a conventional slide rule without charts, tables, nomographs, intermediate calculations, or notation!

Designed by engineers . . . for engineers and others whose work involves power transmission and bearing problems. Designed for those who will have increasing need to make quick, easy, accurate conversions from metric $\longleftrightarrow$ customary $\longleftrightarrow$ metric.

FEATURES

1. A quality 12" rule with full 10" scales, manufactured by PICKETT to the exact specifications of the editors of POWER TRANSMISSION DESIGN Magazine.
2. Not a "trick table" or "sliding chart" but a practical working slide rule with A, B, C, D, and Log Scales for direct calculations in customary or metric units.
3. HP, Torque, and Velocity formulas are spelled out, plus the most common Belt (Pitch Line) Speed Formula.
4. The most often used metric conversion constants are conveniently grouped and those most used in transmission and bearing application work are referenced to the C and D Scales for direct use!
5. All metric conversion constants (except where noted) conform to recommendations of both the American National Standard Z210.1 and the International Organization for Standardization (ISO).
6. Complete general instruction manual by Pickett plus a simple supplementary manual on practical use of transmission and metric features by the editors of POWER TRANSMISSION DESIGN Magazine.
7. Fahrenheit-Celsius Direct Temperature Conversion Scales (-60°F to 680°F) were designed specifically to be of general industrial use, and utilize the full 10" Conversion Scale!
8. Designed for:
 - a. Most common slide rule mathematical computations.
 - b. Most transmission and bearing application work.
 - c. Most common metric conversion work.

A true **triple-purpose rule** that can as easily be used for separate functions or in any combination for extended calculations. The use of the basic logarithmic rule concept permits direct conversion, calculations, and extensions without the ordinary use of intermediate steps or storage of written conversion computations.

9. Each rule is complete with instructions, rugged Texon carrying case, and attractive shipping package.

HOW TO ORDER

1. If you order less than 6 rules, please enclose your check made out to POWER TRANSMISSION DESIGN SLIDE RULE.
2. If you order 6 or more rules we can accept a Purchase Order.
3. Residents of California, Illinois, New York and Ohio please add the appropriate sales tax to your remittance.
4. Mail the completed coupon and payment or Purchase Order to:
POWER TRANSMISSION DESIGN SLIDE RULE
P.O. Box 5748-U Cleveland, Ohio 44101
5. Please allow 30 days for delivery.

PLEASE SEND ME:

Power Transmission Metric Conversion Slide Rules @

1 to 5 rules \$7.95 each
6 or more rules \$5.95 each

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